Fujitsu Dramatically Enhances Color Electronic Paper Functionality

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Figure 1: Display image comparison of Fujitsu's new version vs. previous-version color e-paper

Fujitsu Laboratories today announced the development of a newly-enhanced color electronic paper that features the world's highest-level color image quality. By extensively redesigning the panel structure and image re-write methods of Fujitsu's previous-version color e-paper, in addition to offering bright color, Fujitsu has improved contrast ratio to 7:1 (a threefold improvement compared to Fujitsu's previous version), and has made the image re-write speed twice as fast at 0.7 seconds compared to Fujitsu's previous color e-paper, thus enabling smooth image transitions and color display quality that is at the highest levels available for color e-paper.

Fujitsu's feature-enhanced new color e-paper will be exhibited as

reference at Fujitsu Forum 2010, Fujitsu's largest annual event in Japan, to be held May 13 - 14 at Tokyo International Forum.

E-paper is being heralded as an environmentally friendly electronic display medium that is lightweight and thin like paper, consumes little power, and allows an image to be freely redrawn. While most e-paper applications to date - such as e-book readers - have been monochrome (black and white), Fujitsu Laboratories pioneered the development and practical use of color e-paper, and in 2007 Fujitsu Frontech Limited brought to market FLEPia, the world's first portable information terminal equipped with a color e-paper display.

With demand on the rise for e-paper in areas such as e-book readers and public advertisements, anticipation is mounting for e-paper technology that can display color.

Although extensive R&D in the industry has been conducted for e-paper, in the past as it had been difficult to simultaneously achieve various functionality, such as the ability to feature brightness in color, and simultaneously enhancing brightness and greater contrast ratios while achieving faster re-write speeds, there is anticipation for improvements in color e-paper featuring further enhanced display functionality.

The new feature-enhanced color e-paper developed by Fujitsu Laboratories and to be commercialized by Fujitsu Frontech employs a layered construction found in cholesteric liquid-crystal display (LCD) panels with an image memory function, and makes use of the reflective properties in each color layer where the cholesteric liquid crystals reflect a specific wavelength of light of red, green, or blue (Figure 2). Compared to the reflective displays using a color-filter array widely used in conventional LCDs, Fujitsu's cholesteric LCD method allows for a display that features colors with greater vibrancy and brightness.

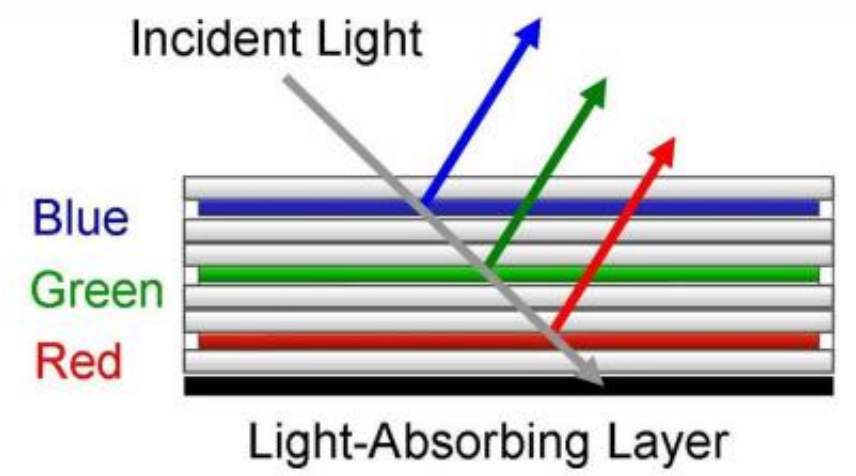

Figure 2: Cholestric LCD panel employed in Fujitsu's color e-paper structure

Fujitsu's new feature-enhanced color e-paper has achieved the world's highest color-image quality, in an extremely slim film panel. Key features of the new color e-paper:

1. Vibrant color display
Fujitsu Laboratories developed a new liquid-crystal material with superior reflective characteristics that can reflect more incoming light, as well as widening the aperture ratio (the effective reflective region) of the display panel to minimize light loss, resulting in a reflectance of 33% (1.3 times brighter compared to Fujitsu's previous color e-paper).

2. High contrast ratio
With a panel structure that suppresses excess reflection caused by the scattering of incident light when displaying black, the new color e-paper features a 7:1 contrast ratio (three times greater than Fujitsu's previous color e-paper).

3. Smooth re-writing of the display image
A newly developed driver control method results in re-write speeds that are roughly twice as fast the speeds of Fujitsu's previous color e-paper, enabling the re-write display of a high-resolution image (1,024 x 768 XGA) in 0.7 seconds.

Enhanced brightness and contrast offered by Fujitsu's new color e-paper allows for more attractive, readable displays, while improvements in write speed result in smoother image transitions. These significant performance improvements in e-paper display technology have broadened its range of potential applications as a paper-like electronic media, such as applications in portable electronic media like e-book readers, public billboards and commercial advertising.

Fujitsu Frontech is scheduled to commercialize the new color e-paper technology this fall for the Japanese market.

Source: Fujitsu